NII at TRECVID Instance Search 2014

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Abstract

We report our Instance Search system which based on last year BOW framework and a new spatial consistency enforcement method. Our system this year **improves 29.9%** MAP comparing to last year system. The main contribution is to propose a new **point-based and region-based post-processing method**: (1) using RANSAC for removing noise shared words, (2) DPM for object localization (3) combining BOW, RANSAC and DPM with an efficient score formula.

Framework Overview

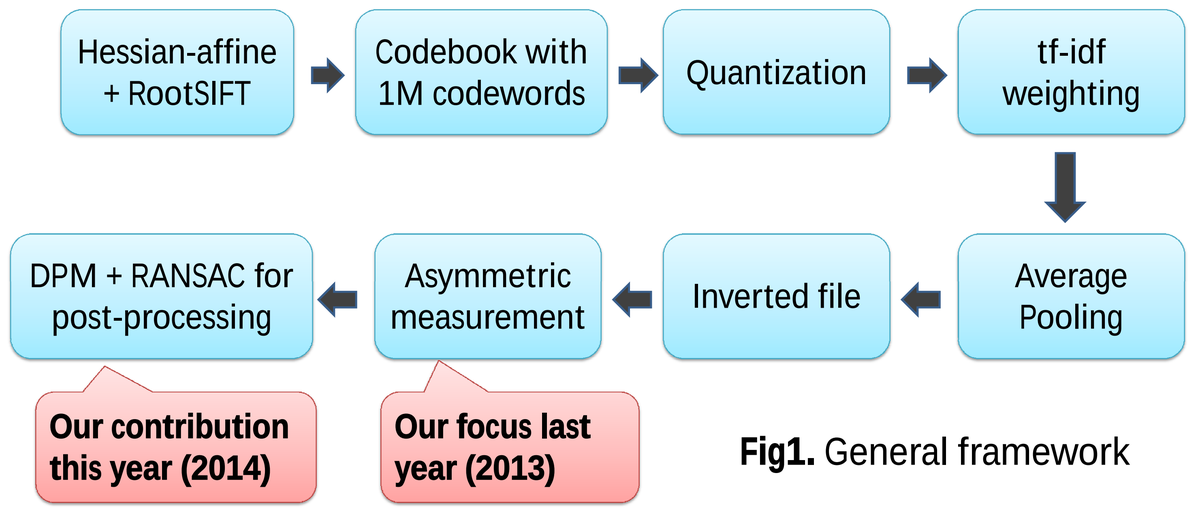

Fig1. General framework

A combination of geometric verification methods

Existing methods

- Point-based method such as RANSAC is not effective when working with small and less feature point (< 4 shared words)

- Shape-based object localization such as Deformable Part Models (DPM) works properly with small and highly discriminative shape objects (e.g. logo)

➔ They are complementary each other

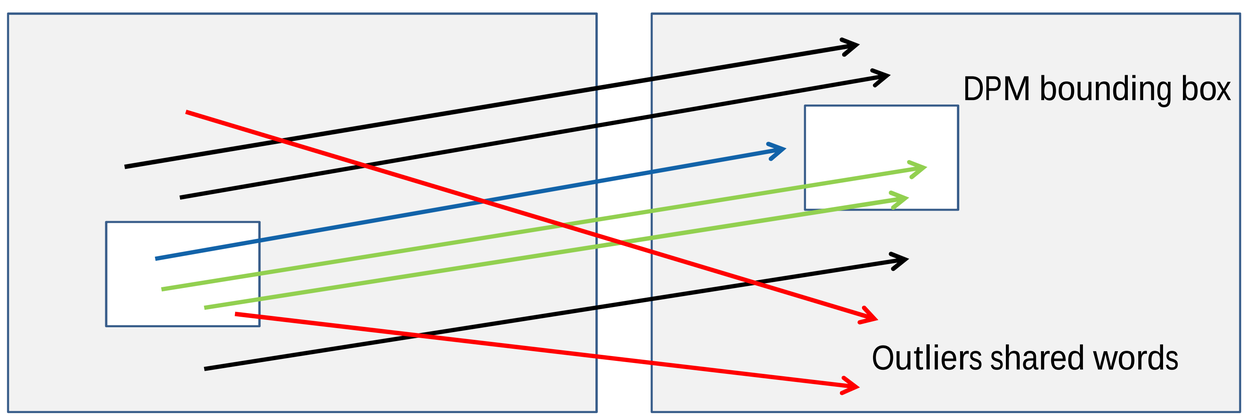

Fig2. Point based and region based reranking method

Proposed method

Step 1: Get top K shots (K=10.000) from BOW model with asymmetric dissimilarity

Step 2: Run RANSAC algorithm to remove noise shared words between queries and frame shots

Step 3: Train DPM model for query

Step 4: Run DPM with trained model for each frame shot to get bounding box

Step 5: compute new score based on inlier shared words and bounding box region Snew

Proposed score for post-processing

$$S_{new} = (1+N_d)^2 (1+N_{fg}-N_d)\log_2(2+N_{bg})(w_1 S_{BOW} + w_2 S_{DPM})$$

where:

N_d : number of shared words of foreground inside bounding box (green lines)
N_{fg} : number of shared word of foreground (both blue and green lines)
N_{bg} : number of shared word of background (black lines)
w_1 : weight of BOW score
w_2 : weight of DPM score

Experimental Results

Efficiency of the proposed system:

Run Name	MAP*
BOW with asymmetric dissimilarity	22.51
DPM only	19.11
BOW + RANSAC	25.67
Proposed method	29.24

(*)this score is computed using ourselves MAP function

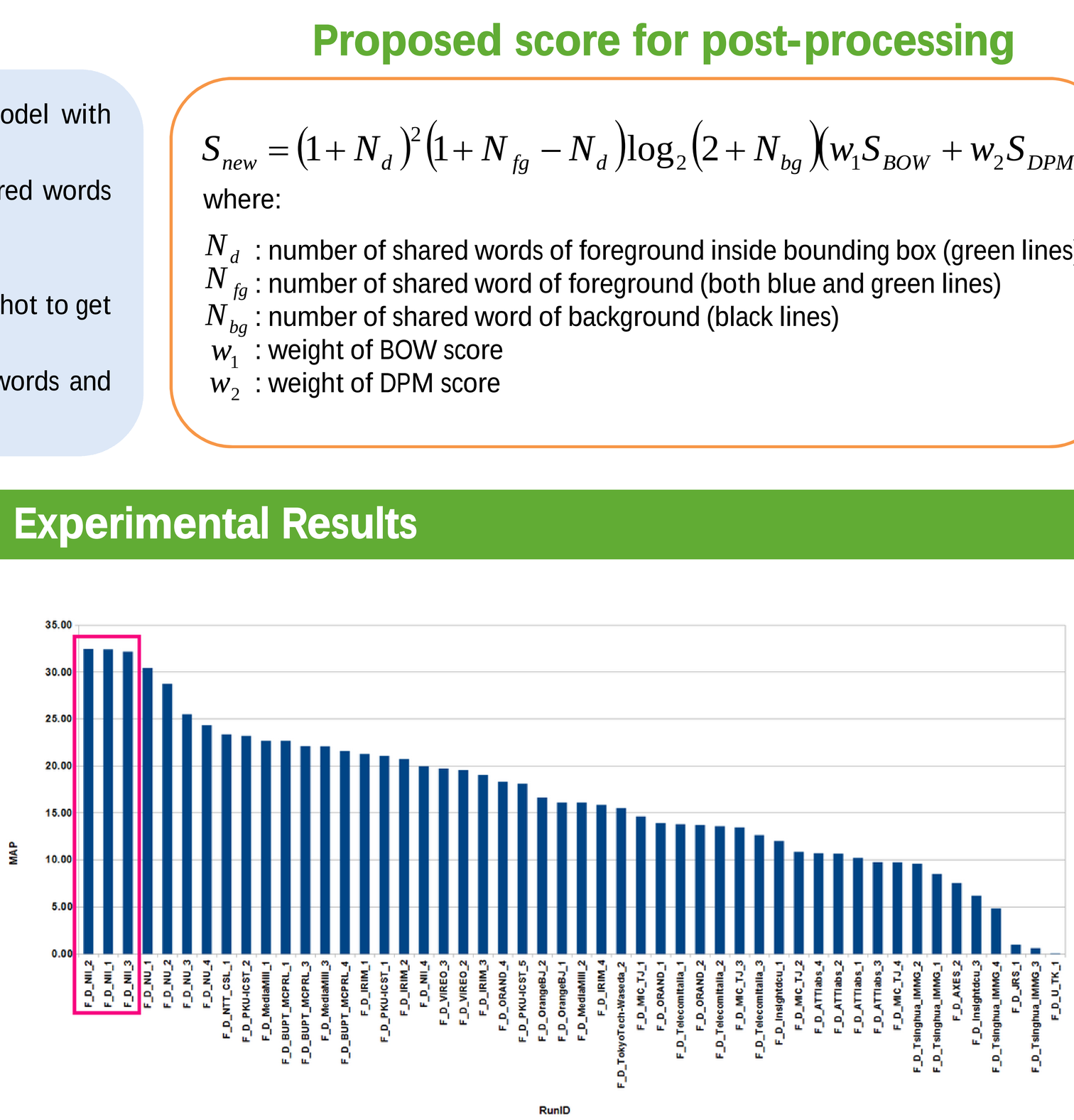

Fig3. Comparison of our system with other teams at TRECVID INS 2014

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